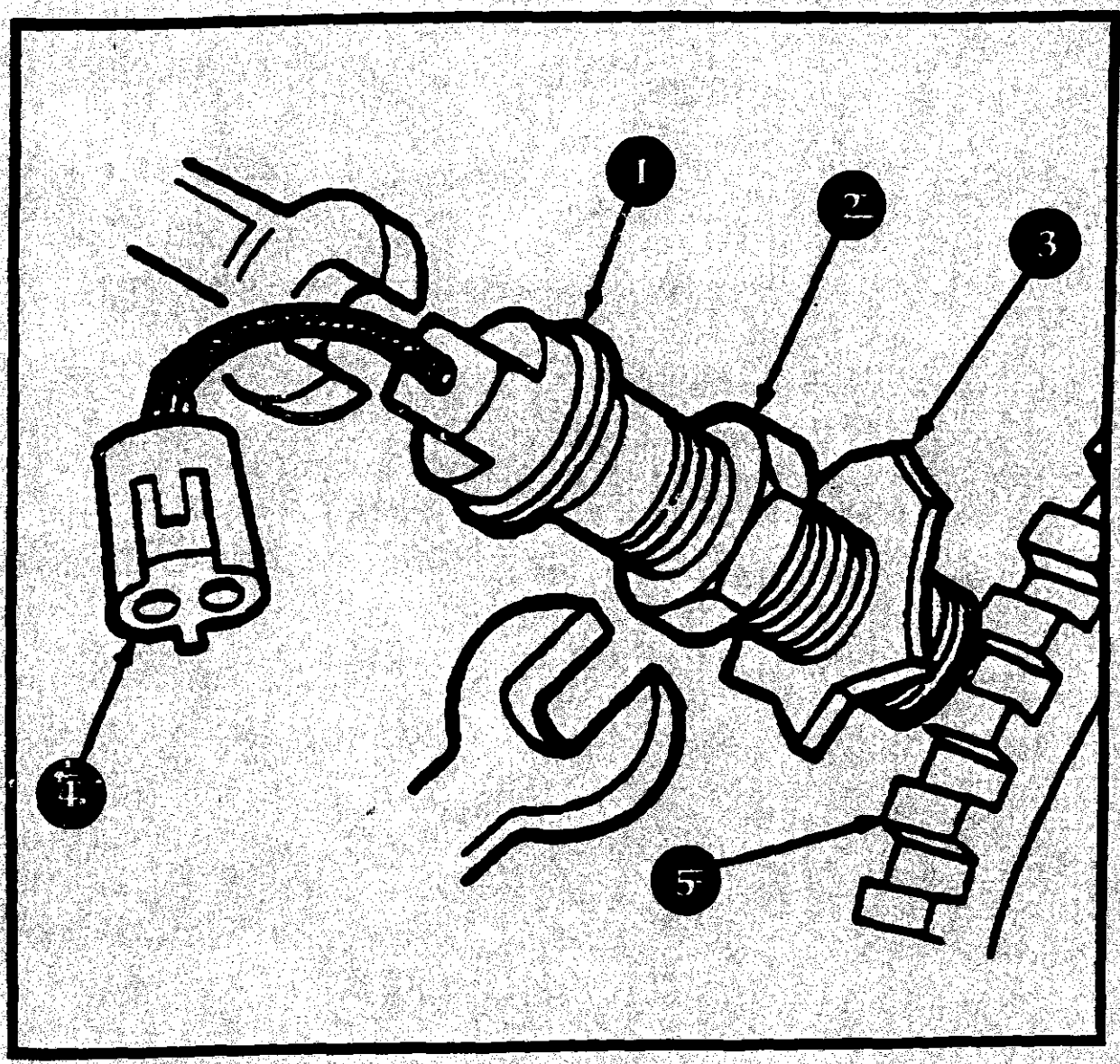
Preventive Maintenance Manual
for Virginia School Buses

March 2003



Virginia Department of Education

FOREWORD

The purpose of this publication is to provide information regarding preventive maintenance, which is essential to the safe and efficient operation of school buses. An effective maintenance program can reduce accidents, downtime, and maintenance costs, as well as improve driver morale and public relations.

The driver's daily pre-trip inspection is the first step in preventive maintenance. Proper training and supervision are needed to make drivers aware of their responsibilities. An open line of communication among drivers, bus shop personnel, and school administrators is a must.

To control losses and protect a school division's investment in a fleet of buses, it is important to inspect and maintain all school buses systematically and conscientiously.

Accurate maintenance records are essential in determining the effectiveness of a preventive maintenance program.

This publication is the result of work by the Pupil Transportation Service of the Department of Education and by an advisory committee whose members were chosen from school divisions in Virginia. This manual should prove helpful to persons initiating preventive maintenance programs or considering changes to existing programs.

CONTENTS

SECTION I – DRIVER'S DAILY PRE-TRIP INSPECTION

Drivers can make or break a school bus preventive maintenance program. While the technician sees a bus periodically, the driver uses that bus everyday. By making effective inspections before each trip and noticing how the bus performs during each trip, the driver often can detect early signs of developing mechanical problems.

Drivers are responsible for checking, recording, and reporting the mechanical condition of their buses, "Regulations Governing Pupil Transportation Including Minimum Standards For School Buses In Virginia 8 VAC 20-70-380". Regardless of whether they find any defects, they should submit written bus condition reports that are accurate and complete.

Included in this publication are sample forms to be used in inspecting and reporting defects daily and monthly. Procedures for reporting the condition of school buses should be established to meet the needs of individual localities.

SCHOOL BUS DRIVER'S DAILY PRE-TRIP INSPECTION

DRIVER_____ BUS NO._____ MILAGE_____ DATE_____

COMPLETE ONLY IF REPAIRS ARE NEEDED

MARK (X) FOLLOWING ITEM NEEDING REPAIR

STEERING	_____	GOVERNOR	_____
BRAKE, SERVICE	_____	CLEAN: INTERIOR - EXTERIOR	_____
BRAKE, PARKING	_____	TIRES	_____
STOP SIGN & CROSSING ARM	_____	FIRE EXTINGUISHER	_____
EXHAUST SYSTEM	_____	FIRST AID KIT	_____
ENTRANCE STEPWELL	_____	CLEAN-UP KIT	_____
ALL DOOR CONTROLS	_____	TRIANGLE REFLECTOR KIT	_____
ALL DOOR BUZZERS & LIGHTS	_____	DRIVER'S SEAT BELT	_____
ALL DOOR GLASS	_____	ALL SEATS & SEAT BELTS	_____
WINDSHIELD	_____	COOLING SYSTEM	_____
WINDSHIELD WIPERS & WASHERS	_____	ENGINE	_____
SUN VISOR	_____	BELTS	_____
SIDE GLASS	_____	TRANSMISSION	_____
HORN	_____	CLUTCH	_____
ALL LIGHTS	_____	DRIVE SHAFT	_____
TURN SIGNALS & 4-WAYS	_____	DIFFERENTIAL	_____
ALL MIRRORS	_____	LETTERING - PAINT	_____
INSTRUMENTS	_____	SHEET METAL	_____
TIE DOWNS & SECUREMENT DIVICES	_____	WHEELCHAIR LIFT	_____

REMARKS

IF REPAIRS ARE NEEDED, FOLLOW LOCAL PROCEDURE

SIGNATURE OF SUPERVISOR_____ DATE_____

WHITE COPY SUPERVISOR
YELLOW COPY DRIVER

MONTHLY RECORD OF DAILY PRE-TRIP INSPECTIONS

COMPLETE DAILY AND TURN IN AT THE END OF THE MONTH

MONTH DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
UNDER BUS																															
ENGINE COMPARTMENT																															
INSIDE BUS																															
RIGHT FRT. TIRE AREA																															
FRONT AREA																															
LEFT FRT. TIRE AREA																															
UNDER VEHICLE																															
LEFT REAR TIRE AREA																															
REAR OF BUS																															
RIGHT REAR TIRE AREA																															
FUEL AREA																															
INSIDE BUS																															
FINAL CHECK																															

DRIVERS INITIALS																															

BUS NUMBER _____

PRE-TRIP INSPECTION—STEP BY STEP PROCEDURE

A. FRONT OF BUS
- 1.CHECK UNDER BUS FOR LEAKS
- 2.CHECK ENGINE COMPARTMENT
  - A.OIL LEVEL
  - B.COOLANT LEVEL
  - C.POWER STEERING FLUID
  - D.WATER PUMP-LOOSENESS
  - E.ALTERNATOR-LOOSENESS
  - F.AIR COMPRESSOR-LOOSENESS
  - G.AIR LEAKS
  - H.MASTER CYLINDER-LEAKS
  - I.ALL BELTS
  - J.WINDSHIELD WASHER FLUID

B. INSIDE BUS
- 1.START ENGINE
  - A.CHECK OIL PRESSURE
  - B.CHECK ALTERNATOR VOLTAGE
  - C.CHECK AIR PRESSURE
  - D.CHECK STEERING PLAY
  - E.CHECK PARKING BRAKE
  - F.CHECK MIRRORS & WINDSHIELD
  - G.CHECK WIPERS
  - H.CHECK LIGHT INDICATORS
  - I.CHECK HORN
  - J.CHECK HEATER & DEFROSTER
  - K.CHECK SAFETY EQUIPMENT
  - L.DO AIR BRAKE CHECK

C. TURN ON ALL LIGHTS & EXIT BUS

D. START AT RIGHT FRONT TIRE
- 1.CHECK HUB OIL SEAL
- 2.CHECK LUG NUTS
- 3.CHECK RIM
- 4.CHECK TIRE &TREAD
- 5.CHECK SPRING & MOUNTS
- 6.CHECK SHOCK ABSORBER
- 7.CHECK SLACK ADJUSTER (AIR BRAKE)
- 8.CHECK BRAKE CHAMBER (AIR BRAKE)
- 9.CHECK BRAKE HOSES
- 10.CHECK DRUM OR ROTOR

E. GO TO FRONT OF BUS
- 1.CHECK MIRROR AT ENTRANCE DOOR
- 2.CHECK ALL LIGHTS
- 3.CHECK FRONT MIRRORS

F. LEFT FRONT TIRE
- 1.CHECK HUB OIL SEAL
- 2.CHECK LUG NUTS
- 3.CHECK RIM
- 4.CHECK TIRE & TREAD
- 5.CHECK SPRING & MOUNTS
- 6.CHECK SHOCK ABSORBERS
- 7.CHECK SLACK ADJUSTER (AIR BRAKE)
- 8CHECK BRAKE CHAMBER (AIR BRAKE)
- 9.CHECK BRAKE HOSE
- 10.CHECK DRUM OR ROTOR
- 11.CHECK STEERING BOX
- 12.CHECK STEERING LINKAGE
- 13.CHECK DRIVER SIDE MIRROR

G. CHECK UNDER VEHICLE (DRIVER SIDE)
- 1.CHECK DRIVE SHAFT
- 2.CHECK EXHAUST SYSTEM
- 3.CHECK FRAME
- 4.LOOSE WIRING. PARTS. OR COMPONENTS

H. REAR WHEEL (DRIVERS SIDE)
- 1.CHECK HUB OIL SEAL
- 2.CHECK LUG NUTS
- 3.CHECK RIM
- 4.CHECK TIRE & TREAD
- 5.CHECK SPRING & MOUNT
- 6.CHECK SHOCK ABSORBER
- 7.CHECK SLACK ADJUSTER (AIR BRAKE)
- 8.CHECK BRAKE CHAMBER (AIR BRAKE)
- 9.CHECK BRAKE HOSES
- 10.CHECK DRUM OR ROTOR

I. REAR OF BUS
- 1.CHECK ALL LIGHTS
- 2.CHECK ALL REFLECTORS
- 3.CHECK REAR EMERGENCY DOOR

J. REAR WHEEL (PASS. DOOR SIDE)
- 1.CHECK HUB OIL SEAL
- 2.CHECK LUG NUTS
- 3.CHECK RIM
- 4.CHECK TIRE & TREAD
- 5.CHECK SPRING & MOUNT
- 6.CHECK SHOCK ABSORBER
- 7.CHECK SLACK ADJUSTER (AIR BRAKE)
- 8.CHECK BRAKE CHAMBER (AIR BRAKE)
- 9.CHECK BRAKE HOSES
- 10.CHECK DRUM OR ROTOR

K. CHECK FUEL AREA
- 1.CHECK FUEL TANK
- 2.CHECK FOR FUEL LEAKS

L. CHECK INSIDE BUS
- 1.CHECK ENTRANCE DOOR
- 2.CHECK HANDRAILS
- 3.CHECK SEATS
- 4.CHECK ALL EMERGENCY EXITS
- 5.CHECK EMERGENCY EQUIPMENT

M. FINAL CHECK
- 1.CHECK BRAKE AND BACK UP LIGHT
- 2.CHECK CLUTCH & TRANSMISSION
- 3.CHECK BRAKES
- 4.CHECK STEERING

Description of Step by Step Pre-Trip Inspection

A. Front of bus

1. Check under bus for leaks

    a. Look for wet spots on the ground
        1. The area may be darker, shine, oil slick
        2. Green or pinkish fluid indicates antifreeze, red fluid would be power steering fluid, black fluid would be oil.

2. Check engine compartment

    a. Oil level: pull dipstick and check level when engine is cold. The most accurate reading is in the morning prior to starting the engine.

    b. Coolant level: remove the radiator cap and look for green or pinkish fluid level. Some buses have an indicator eye on the radiator which indicates the coolant level, some buses have a holding tank that should be half full of coolant – in any case if the coolant level is not correct – call the shop.

    c. Power steering fluid: remove the cap and check level of fluid when engine is cold. It should register on the full mark - if not full, call the shop

    d. Water pump: look to see if any bolts are missing. Grab the fan blades and check for looseness.

    e. Check alternator: look to see if any bolts are missing. Grab housing and check for looseness. Check belt tension by trying to turn the pulley by hand. If you can turn the pulley by hand, the belts are too loose (call the shop).

    f. Check air compressor: grab compressor and check for looseness (Call shop if loose).

    g. Check master cylinder: look at the clear tank to check fluid level . If fluid level is more than 1 inch from master cylinder cap - call shop

h. Check for leaks: look for black fluid (oil), green or pinkish fluid (antifreeze), red fluid (power steering) and clear shiny areas (brake fluid) as possible leaks. Common areas are the fire wall , around the master cylinder, exhaust pipes, and valve covers for oil leaks and wet areas on radiator and hoses – call shop if leaks are noted.

i. Check belts: look for frayed, cracked or worn spots on the belts. Report worn or frayed belts to shop

B. Check inside bus

a. Oil pressure: check gauge for building oil pressure. Stop engine and call shop if no pressure.

b. Alternator: check voltmeter for proper voltage – 12 to 14 volts.

c. Air pressure: check gauge for building pressure

d. Steering: check steering by turning the steering wheel in both directions for free play of no more than two inches.

e. Parking brake: set parking brake and put transmission in gear and try to pull forward. If bus moves forward, you are to call the shop.

f. Mirrors and windshield: look for cracks and fog areas in both windshield and mirrors

g. Wipers: turn on and make sure they work and the blades are in good condition.

h. Dash indicator lights: turn on signal, head, dash and warning lights to see if they are working.

i. Horn: depress horn button and see if both horns are working

j. Heater/defroster: turn on and see if motors are blowing air.

K. Air brake check:

1. Build up air pressure to 120
2. Turn engine off - check to see that pressure does not drop more than 2 lbs. in one minute.
3. Turn key on and apply the brake and hold steady pressure. Check to see that the pressure does not drop more than 3 lbs. in one minute.
4. Begin pumping brakes to decrease air pressure. At approx. 60 lbs. of air pressure, the warning light should come on and the buzzer should sound. Continue pumping the brakes until the pressure drops below 40 lbs. – the emergency brakes should pop on.
5. Call the shop if any step in this check fails

C. Check lights on outside of bus

1. Turn on headlights, 4-way hazard, clearance lights and red traffic warning lights. Check head light dimmer switch.
2. Exit bus with engine running, transmission in neutral and park brake set.

D. Right front tire

1. Hub oil seal: look for grease or oil leaking from seal. The area will appear to be wet or shiny. Look for bolts missing.
2. Lug nuts: look for missing lugs. Look for rust around lugs. Check loose lugs by turning lugs with your hand.
3. Rim: look for cracks, indentations or welds.
4. Tire: look for cuts, wear bars, knots or any other imperfections in the tire. Tread depth must be a minimum of 4/32 or 1/8" on any tread on the tire.
5. Spring and spring mount: look for broken spring leaves—will look like a line of rust. Look at u-bolts and spring hangers for cracks or looseness or missing cotter keys.
6. Shock absorbers: grab shock with hand and shake for looseness. Look for oil running out of the shock or wet area on bottom of shock.
7. Slack adjuster (air brake only) check that both pins have cotter keys. The slack adjuster should be set at 90 degrees. All 4 wheels should be at the same angle.
8. Brake chamber: (air brake only) look for loose or missing bolts. Look for rust around the chamber.

9. Brake hoses: look for wet or shiny areas on hose or around fittings. Look for frayed cracked or rubbing hoses.
10. Drum or rotor: look for cracks or missing pieces

E. Front of bus

1. Mirror at entrance door: grab and shake to see if loose. Look for broken brackets or missing bolts.
2. Lights: look for headlights, 4-way hazard, clearance, red traffic warning lights.
3. Crossing gate: should be in the extended position.
4. Crossover mirrors: check for looseness and broken brackets
5. Stop sign: sign should be out and lights flashing.

F. Left front tire

1. Hub oil seal: look for grease or oil leaking from seal. The area will appear to be wet or shiny. Look for bolts missing.
2. Lug nuts: look for missing lugs. Look for rust around lugs. Check loose lugs by turning lugs with your hand.
3. Rim: look for cracks, indentations or welds.
4. Tire: look for cuts, wear bars, knots or any other imperfections in the tire. Tread depth must be a minimum of 4/32 or 1/8"on any tread on the tire.
5. Spring and spring mount: look for broken spring leaves—will look like a line of rust. Look at u-bolts and spring hangers for cracks or looseness or missing cotter keys.
6. Shock absorbers: grab shock with hand and shake for looseness. Look for oil running out of the shock or wet area on bottom of shock.
7. Slack adjuster (air brake only) check that both pins have cotter keys. The slack adjuster should be set at 90 degrees. All 4 wheels should be at the same angle.
8. Brake chamber (air brake only) look for loose or missing bolts. Look for rust around the chamber
9. Brake hoses: look for wet or shiny areas on hose or around fittings. Look for frayed, cracked or rubbing hoses.
10. Drum or rotor: look for cracks or missing pieces.
11. Steering box: check for fluid leaks. Check mounting bolts.
12. Steering linkage: look for missing nuts, bolts, cotter keys, or other parts. Check for bent, loose or broken parts.

G. Under bus (driver's side)

1. Drive shaft: make sure that all u-shaped safety brackets are in place. Look to see if u-bolts on drive line are missing.
2. Exhaust sysem: listen for leaks, or smell for fumes. Look for black soot around connections.
3. Frame: look for cracks—cracks will resemble rust lines.
4. Check for loose wiring or items hanging down.

H. Rear wheel (driver's side)

1. Hub oil seal: look for grease or oil leaking from seal. The area will appear to be wet or shiny. Look for bolts missing.
2. Lug nuts: look for missing lugs. Look for rust around lugs. Check loose lugs by turning lugs with your hand.
3. Rim: look for cracks, indentations or welds.
4. Tire: look for cuts, wear bars, knots or any other imperfections in the tire. Tread depth must be a minimum of 4/32 or 1/8" on any tread on tire.
5. Spring and spring mount: look for broken spring leaves—will look like a line of rust. Look at u-bolts and spring hangers for cracks or looseness or missing cotter keys.
6. Shock absorber: grab shock with hand and shake for looseness. Look for oil running out of the shock or wet area on bottom of shock.
7. Slack adjuster (air brake only) check that both pins have cotter keys. The slack adjuster should be set at 90 degrees. All 4 wheels should be at the same angle.
8. Brake chamber (air brake only) look for loose or missing bolts, look for rust around the chamber.
9. Brake hoses: look for wet or shiny areas on hose or around fittings. Look for frayed, cracked or rubbing hoses.
10. Drum or rotor: look for cracks or missing pieces.

I. Rear of bus

1. Lights: check tail lights, 4-way hazard, traffic warning lights and clearance lights.
2. Check reflectors: red on rear and yellow on front.
3. Rear emergency door: be sure door opens freely and that gaskets are in place around door.
4. Make sure exhaust extends out from underneath the bus

J. Rear wheel (passenger side)

1. **Hub oil seal: look for grease or oil leaking from seal. The area will appear to be wet or shiny.**
2. **Lug nuts: look for missing lugs, look for rust around lugs. Check loose lugs by turning lugs with your hand.**
3. **Rim: look for cracks , indentations or welds.**
4. **Tire: look for cuts, wear bars, knots or any other imperfections in the tire. Tread depth must be a minimum of 4/32 or 1/8" on any tread on the tire**
5. **Spring and spring mounts: look for broken spring leaves—will look like a line of rust. Look at u-bolts and hangers for cracks or looseness or missing cotter keys.**
6. **Shock absorber: grab shock with hand and shake for looseness . Look for oil running out of the shock or wet area at bottom of shock.**
7. **Slack adjuster: (air brake only) check that both pins have cotter keys. The slack adjuster should be set at 90 degrees. All 4 wheels should be at the same angle.**
8. **Brake chamber (air brake only) look for loose or missing bolts. Look for rust around the chamber.**
9. **Brake hoses: look for shiny or wet areas on hose or around fittings. Look for frayed, cracked or rubbing hoses.**
10. **Drum or rotor; look for cracks or missing pieces.**

K. **Fuel area**

1. **Tank: check to see that fuel cap is on tank. Look for gasket on fuel cap. Look for cracks or loose parts or missing pieces of fuel tank cage.**
2. **Leaks: look for fuel spills on the ground.**

L. **Passenger area inside bus**

1. **Entrance door: check for broken glass and door closing properly.**
2. **Step treads: all treads to be securely fastened and not pose a tripping hazard. Keep area open and free of any articles.**
3. **Handrails: check for looseness and catchpoints.**
4. **Seats: when walking to the back of the bus, grab the back corner of the seat and pull up to see if properly attached. Do one row at a time. All seats must be checked. Check for cut or torn covers.**
5. **Emergency doors and windows: open to check alarm buzzer**
6. **Seat backs: check the backs of each seat by grabbing the top corner of the seat and shake to see if it is loose or broken.**
7. **Windows: check for cracked or broken glass. Check for proper operation.**

8. **Folding seat (at emergency side door) check for proper fold up operation.**
9. **Roof hatch: open to check alarm buzzer.**
10. **Emergency equipment: see that fire extinguisher is secured properly and fully charged. Check triangle reflective markers. Check first aid kit – replenish if needed.**

M. **Final check**

1. **Brake, backup light and turn signals: put in reverse and check backup light. Depress brake pedal and look for red reflection of brake lights. Check each turn signal front and rear.**
2. **Clutch and transmission: start bus and put in gear—release clutch and check for proper engagement.**
3. **Brake: pull forward and depress brake to check for proper stopping ability.**
4. **Steering: work steering wheel back and forth to check for proper control.**

SECTION II – INSPECTION SCHEDULES AND GUIDELINES

The purpose of this section is to assist personnel who are responsible for the maintenance of school buses by providing schedules, checklists, and guidelines governing inspections.

The **#1 Inspection Checklist** will replace the old **Inspection "A" Checklist.** This form is to be used for inspections performed at the times indicated in the manual. Such inspections are required by the Board of Education. (8 VAC 20-70-130, "Regulations Governing Pupil Transportation Including Minimum Standards For School Buses In Virginia) The **#2 Inspection Checklist** replaces the old **Inspection "B" & "C" Checklists** and includes all items on #1 Inspection Checklist plus additional items.

Guidelines for inspections #1 and #2 include items to inspect, inspection schedules, and operations to perform.

MINIMUM INSPECTION SCHEDULES:

#1 INSPECTION – EVERY 30 OPERATING DAYS OR EVERY 2500 MILES

#2 INSPECTION – EVERY 180 OPERATING DAYS OR EVERY 15000 MILES

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30 OPERATING DAYS OR 2500 MILES

INSPECTION # 1

DATE_____ MILEAGE_____ BUS #_____ CHASSIS #_____

INDICATE THE CONDITION OF EACH ITEM IN SPACE PROVIDED WITH THE FOLLOWING:

(✓) = OK (A) = ADJUSTMENT MADE (X) = REPAIR MADE OR NEEDED

A. ROAD TEST		C. EXTERIOR		E. FRONT AXLE	
STARTER ACTION		RUB RAILS & SHEET METAL		FLUID LEAKS	
ENGINE OPERATION		HOOD & FENDERS		STEERING LINKAGE	
OIL PRESSURE		STIRRUP STEPS		SHOCK ABSORBERS	
HORN		LICENSE PLATES		BRAKE LINING	
LIGHTS		TOW HOOKS		WHEELS	
CLUTCH		BUMPERS		SLACK ADJUSTERS	
STEERING		ALL TIRES		SPRINGS	
TRANSMISSION		ALL LIGHTS & SIGNALS			
BACK-UP ALARM		REFLECTORS			
BRAKE CHECK		REFOREFLECTIVE MARKINGS			
INSTRUMENTATION		PAINT & LETTERING			
MIRRORS		MIRRORS			
HEATER/DEFROSTER		STORAGE & CHAIN BOXES			
WINDSHIELD WIPERS					
WINDSHIELD WASHERS		D. ENGINE COMPARTMENT		F. REAR AXLE	
STOP ARM & XING GUARD					
GOVERNOR		ALL BELTS		FLUID LEAKS	
		LEAKS		BREATHER	
B. BODY INTERIOR		GOVERNOR(S)		SHOCK ABSORBERS	
		FAN ASSEMBLY		BRAKE LINING	
AISLE & FLOOR		WATER PUMP		WHEELS	
INTERIOR PANELS		AIR COMPRESSOR		SLACK ADJUSTERS	
ENTRANCE DOOR		ALL PIPING & HOSES		SPRINGS	
EMER. DOORS & EXITS		ALL WIRING			
EMERGENCY EQUIPMENT		STEER.GEAR & HYD. PUMP			
DRIVER'S SEAT		MASTER CYLINDER			
STEPS		BRAKE BOOSTER			
SEATS & SEAT BELTS				G. UNDER BUS	
STANCHIONS & BARRIERS					
SUNSHIELD (VISOR)				EXHAUST SYSTEM	
ALL GLASS				CLUTCH	
WINDOWS				AIR TANKS	
LIFT OR RAMP				TRANSMISSION	
WHEELCHAIR POSITIONS				PARKING BRAKE	
RADIOS & CAMERAS				DRIVE LINE	
ALL OPENINGS				FUEL TANK	
STORAGE COMPARTMENTS				HOSES-PIPING-WIRING	
POSTERS & STICKERS				AIR DRYER	
CLEANLINESS				BRAKE CHAMBERS	
HANDRAILS				FRAME & CROSSMEMBERS	

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INSPECTING MECHANIC_____ DATE COMPLETED_____

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180 OPERATING DAYS OR 15000 MILES

INSPECTION # 2

DATE_____ MILEAGE_____ BUS #_____ CHASSIS #_____

INDICATE THE CONDITION OF EACH ITEM IN SPACE PROVIDED WITH THE FOLLOWING:

( ) = OK (A) = ADJUSTMENT MADE (X) = REPAIR MADE OR NEEDED

A. ROAD TEST

STARTER ACTION
ENGINE OPERATION
OIL PRESSURE
HORN
LIGHTS
CLUTCH
STEERING
TRANSMISSION
BACK-UP ALARM
BRAKE CHECK
INSTRUMENTATION
MIRRORS
HEATER/DEFROSTER
WINDSHIELD WIPERS
WINDSHIELD WASHERS
STOP ARM & XING GUARD
GOVERNOR

B. BODY INTERIOR

AISLE & FLOOR
INTERIOR PANELS
ENTRANCE DOOR
EMER. DOORS & EXITS
EMERGENCY EQUIPMENT
DRIVER'S SEAT
STEPS
SEATS & SEAT BELTS
STANCHIONS & BARRIERS
SUNSHIELD (VISOR)
ALL GLASS
WINDOWS
LIFT OR RAMP
WHEELCHAIR POSITIONS
RADIOS & CAMERAS
ALL OPENINGS
STORAGE COMPARTMENTS
POSTERS & STICKERS
CLEANLINESS

C. EXTERIOR

RUB RAILS & SHEET METAL
HOOD & FENDERS
STIRRUP STEPS
LICENSE PLATES
TOW HOOKS
BUMPERS
ALL TIRES
ALL LIGHTS & SIGNALS
REFLECTORS
REROREFLECTIVE MARKINGS
PAINT & LETTERING
MIRRORS
STORAGE & CHAIN BOXES

D. ENGINE COMPARTMENT

ALL BELTS
LEAKS
GOVERNOR(S)
FAN ASSEMBLY
WATER PUMP
AIR COMPRESSOR
ALL PIPING & HOSES
ALL WIRING
STEER.GEAR & HYD. PUMP
MASTER CYLINDER
BRAKE BOOSTER
HEAT RISER
VALVES
RADIATOR MOUNTING
FUEL PUMP
CARBURETOR
BATTERY
CRANKCASE VENT VALVE
DISTRIBUTOR
COIL
COLD START
TURBOCHARGER
VIBRATION DAMPER
ENGINE MOUNTS
COOLING SYSTEM

E. FRONT AXLE

FLUID LEAKS
STEERING LINKAGE
SHOCK ABSORBERS
BRAKE LINING
WHEELS
SLACK ADJUSTERS
SPRINGS
KING PINS & BUSHINGS
WHEEL CYLINDER/CALIPERS
HUBS, DRUMS, ROTORS
WHEEL BEARINGS
WHEEL BALANCE
ALIGNMENT

F. REAR AXLE

FLUID LEAKS
BREATHER
SHOCK ABSORBERS
BRAKE LINING
WHEELS
SLACK ADJUSTERS
SPRINGS
WHEEL CYLINDERS/CALIPERS
HUBS, DRUMS, ROTORS
WHEEL BEARINGS

G. UNDER BUS

EXHAUST SYSTEM
CLUTCH
AIR TANKS
TRANSMISSION
PARKING BRAKE
DRIVE LINE
FUEL TANK
HOSES-PIPING-WIRING
AIR DRYER
BRAKE CHAMBERS
FRAME & CROSSMEMBERS

INSPECTING MECHANIC_____ DATE COMPLETED_____

A. ROAD TEST

A – 1	Starter Action	1	2	Check whether starter turns engine at normal speed.
		1	2	Check for snappy action, noise and operation of starter drive.
A – 2	Engine Operation	1	2	Check for unusual noise or vibration at all engine speeds.
		1	2	Check for rough idling and misfiring.
		1	2	Check for bearing noises, piston slap and knocks.
		1	2	Check color of exhaust.
		1	2	Check operation of glow plugs and engine shut down.
A – 3	Oil Pressure	1	2	Check pressure at idle and gov. speed.
A – 4	Horn	1	2	Check for proper operation.
A – 5	Lights	1	2	Check all instrument lights for proper illumination of instruments.
		1	2	Check all warning and indicator lights.
		1	2	Check interior courtesy light.
A – 6	Clutch	1	2	Check for proper free travel and operation.
A – 7	Steering	1	2	Check for excessive play.
A – 8	Transmission	1	2	Check for proper operation by shifting through shift pattern.
A – 9	Back up Alarm	1	2	Check for proper operation.
A – 10	Brake Check (AIR)	1	2	Chock wheels if necessary and push in parking brake knob.
		1	2	Start engine.
		1	2	Air pressure build up from 50 to 90 psi should not exceed 5 min. at first engine idle.

	Brake Check (AIR) (Continued)	1	2	Compressor governor cut out pressure should be reached at approximately 120 psi.
		1	2	Shut off engine and **TURN KEY BACK ON**.
		1	2	Depress brake pedal and hold-any leakage should not exceed 4 psi per minute.
		1	2	Step on and off brake pedal to decrease air pressure-warning light and buzzer should activate at about 60 psi.
		1	2	Continue to decrease air pressure-parking brake knob should pop out between 20 and 45 psi.
		1	2	Restart engine, shift into low gear and gently pull against brakes to make sure they will hold.
	[HYDRAULIC]	1	2	Push and hold down brake pedal-should be firm (not spongy) and should not creep toward floor.
		1	2	Check operation of brake power unit.
		1	2	Set hand brake [Orschlein]- must cam over center [adjust if necessary]
		1	2	With park brake set, engage transmission and gently pull against brake to check holding ability.
A - 11	Instrumentation	1	2	Check for proper operation of all instruments.
A – 12	Mirrors	1	2	Check all mirrors for clear visibility.

A. ROAD TEST

A – 13	Heaters & Defrosters	1	2	Check for proper operation.
			2	Clean rear heater filter/core.
A – 14	Windshield Wipers	1	2	Check for proper operation.
A – 15	Windshield Washers	1	2	Check for proper operation.
A – 16	Stop Arm & Crossing Guard	1	2	Check for proper operation by cycling through warning lights, entrance door opening.
		1	2	Check speed of arm and guard on air operated systems and adjust if necessary.
A – 17	Road Speed Governor	1	2	Check for proper operation. (Maximum 55 MPH)

B. BODY INTERIOR

B – 1	Aisle & Floor	1	2	Check condition of aisle and floor covering.
B – 2	Interior Panels	1	2	Check for sharp edges and damage.
B – 3	Entrance Door	1	2	Check operation-adjust controls-lubricate hinges.
		1	2	Check seals-repair or replace as needed.
		1	2	Check operation of safety latch.
B – 4	Emergency Doors & Exits	1	2	Check vandal lock, door and emergency exit alarm buzzer operation.
		1	2	Lubricate hinges.
		1	2	Check door seals, checkstrap and handle guards.
B – 5	Emergency Equipment	1	2	Check fire extinguisher mounting and pressure.
			2	Turn fire extinguisher upside down and shake to loosen chemicals.
		1	2	Check first aid kit mounting and contents.
		1	2	Check retroreflective triangles and mounting.
		1	2	Check body fluid clean up kit mounting and contents.
B – 6	Drivers Seat	1	2	Check for secure mounting.
		1	2	Check safety belt for proper operation and securement.
		1	2	Check for damaged upholstery.
B – 7	Steps	1	2	Inspect step covering and nosing.
			2	Inspect stepwell for deterioriation.

B. BODY INTERIOR

B – 8	Seats	1	2	Check for: Condition and operation of seat belts Broken frames Loose backs and cushions Secure mounting Damaged upholstery or foam Sharp metal or edges
B – 9	Stanchions, Rails & Barriers	1	2	Check for: Proper padding Secure mounting Damaged upholstery
B – 10	Sunshield (visor)	1	2	Check for secure mounting and operation.
B – 11	All Glass	1	2	Inspect and replace any damaged glass.
B – 12	Windows	1	2	Check for ease of operation-lubricate as necessary.
B – 13	Lift or Ramp	1	2	Inspect for: Proper operation Fluid leaks Damaged or worn parts Defective wiring Covers on sharp edges Lubricate moving parts per manufacturer.
B – 14	Wheelchair Positions	1 1	2 2	Inspect all securement devices and mounting. Check condition and operation of all restraining devices.
B – 15	Radios, Tape Decks, and Video Cameras	1	2	Check for: Secure Mounting and connections. Loose or exposed wiring. Proper mounting of antenna. Protruding speakers.
B – 16	All Openings	1	2	Check all dust boots-shift lever, emergency brake lever, steering column.

B. BODY INTERIOR

B- 17	Storage Compartment	1	2	Check for secure mounting.
		1	2	Check latch assembly for proper operation.
		1	2	Remove any trash. cans, and bottles.
B – 18	Posters and Stickers	1	2	Remove any posters or stickers that are not approved.
B – 19	Loose objects and Cleanliness	1	2	Remove any loose objects-brooms-ice scrapers-trash boxes.

C. EXTERIOR

C – 1	Rub Rails and Sheet Metal	1	2	Check for damage and sharp edges.
C – 2	Hood and Fenders	1	2	Check for damage and sharp edges.
C – 3	Stirrup Steps	1	2	Check for damage and proper operation.
C – 4	License Plates	1	2	Inspect for damage and secure mounting.
C – 5	Tow Hooks	1	2	Inspect for damage and secure mounting.
C – 6	Bumpers	1	2	Inspect for damage and secure mounting.
C – 7	All Tires	1	2	Check for proper inflation.
		1	2	Check condition and remaining tread.
C – 8	All Lights and Signals	1	2	Check operation of all lights and signals.
C – 9	Reflectors	1	2	Check all reflectors for damage and proper mounting.
C – 10	Retroreflective Markings	1	2	Check for damage, deterioriation and proper placement.
C – 11	Faded Paint & Lettering	1	2	Check all painted surfaces and lettering for damage and deterioriation.
C – 12	Mirrors	1	2	Check for secure mounting and damage.
C – 13	Storage and Chain Compartments	1	2	Check latches, hinges, and seals.
		1	2	Remove trash and unwanted items.

D. ENGINE COMPARTMENT

D – 1	All Belts	1	2	Check all drive belts for alignment, correct tension, cracks, and glazing.
D – 2	Leaks	1	2	Check for fuel, coolant, oil, air, brake fluid, power steering fluid, and exhaust leaks.
D – 3	Road Speed Governor	1	2	Check for proper connections.
D – 4	Fan Assembly	1	2	Check for cracked, bent blades and loose rivets.
D – 5	Water Pump	1	2	Check for loose or worn bearings.
D – 6	Air Compressor	1	2	Check for secure mounting and proper operation.
D – 7	All Piping and Hoses	1	2	Check for proper routing and securement.
		1	2	Check for chafing and deterioration.
D – 8	All Wiring	1	2	Check for loose connections, proper routing and securement.
D – 9	Air Cleaner/Restriction Gauge	1	2	Check and replace filter element as called for.
D – 10	Steering Gear and Hydraulic Pump	1	2	Check fluid levels
			2	Torque mounting bolts to factory specifications.
D – 11	Master Cylinder	1	2	Check fluid levels
			2	Torque mounting bolts to factory specifications.
D – 12	Vacuum, Electric, and Hydraulic Brake Boosters	1	2	Check all connections and mounting.
D – 13	Heat Riser		2	Check for free operation.
D – 14	Valves		2	Adjust per factory specs.
D – 15	Radiator Mounting		2	Torque mounting bolts and check stay rods and adjusting nuts.
D – 16	Fuel Pump		2	Torque mounting bolts to specs.

D. ENGINE COMPARTMENT

D – 17	Carburetor		2	Check: Mounting bolts Linkage for excessive play Throttle opening and closing Choke for proper operation
D – 18	Battery		2	Clean battery post and cable connections.
D – 19	Crankcase Ventilation Valve		2	Clean and inspect for proper operation.
D – 20	Distributor		2 2	Check all connections. Check cap, rotor and points.
D – 21	Coil		2	Clean-check primary connection at coil and condition of wires.
D – 22	Cold Weather Starting Device		2	Check for proper operation.
D –23	Turbocharger		2 2	Torque mounting bolts. Check all air intake and exhaust hoses and piping for tightness.
D – 24	Vibration Damper		2	Check for play and looseness.
D – 25	Engine Mounts		2 2	Inspect front and rear insulators for deterioration. Torque all mounting bolts to factory specification.
D – 26	Cooling System		2 2	Pressure test system for leaks. Check chemical balance of coolant and adjust if necessary.

E. FRONT AXLE

E – 1	Fluid Leaks	1	2	Check for fluid leaks at wheel seals, backing plates and underside of engine.
E – 2	Steering Linkage	1	2	Inspect for excessive play: Drag link Pitman arm Steering arms Tie rod ends Idler arm
E – 3	Shock Absorbers	1	2	Check for leaks, wear and damage.
E – 4	Brake Lining	1	2	Check lining and record remaining lining. (adjust if necessary)
E – 5	Wheels	1	2	Inspect condition of wheels, rims, and lock rings.
		1	2	Check nuts and studs for damaged threads and torque to factory specifications.
E – 6	Slack Adjusters	1	2	Check for proper operation and adjust if necessary.
E – 7	Springs	1	2	Check for shifted axle.
		1	2	Check for broken leaves, center bolts, rebound clips, "U" bolts, shackles, and brackets.
			2	Torque "U" bolts to factory specifications.
			2	Tighten all spring bracket mounting bolts.
E – 8	King Pins and Bushings		2	Check for wear-follow instructions for checking as listed in Virginia State Inspection Manual.
E – 9	Wheel Cylinders and Calipers		2	Check for leaks and proper operation.
E – 10	Hubs, Drums, and Rotors (as needed)		2	Remove hub-check drums and rotors for scoring and wear.

E. FRONT AXLE

E – 10	Wheel Bearings (as necessary or when hubs are removed)		2 2 2	Clean, dry check, inspect and repack. Reinstall and tighten to factory specifications. Replace wheel seal.
E – 11	Wheel Balance		*	As necessary
E – 12	Alignment		2	Check (correct if needed)

F. REAR AXLE

F – 1	Fluid Leaks	1	2	Check for fluid leaks at wheel seals, backing plates, pinion seal, differential and cover.
F – 2	Breather	1	2	Check (clean if necessary)
F – 3	Shock Absorbers	1	2	Check for leaks, wear, and damage.
F – 4	Brake Lining	1	2	Check lining and record remaining lining. (adjust if necessary)
F – 5	Wheels	1	2	Inspect condition of wheels, rims, and lock rings.
		1	2	Check nuts and studs for damaged threads and torque to factory specifications.
F – 6	Slack Adjusters	1	2	Check for proper operation and adjust if necessary.
F – 7	Springs	1	2	Check for shifted axle.
		1	2	Check for broken leaves, center bolts, rebound clips, "U" bolts, shackles and brackets.
			2	Torque "U" bolts to factory specifications.
			2	Tighten all spring bracket mounting bolts.
F – 8	Wheel Cylinders and Calipers		2	Check for leaks and proper operation.
F – 9	Hubs, Drums, and Rotors		**	Remove hub-check drums and rotors for scoring, cracks and wear.
F – 10	Wheel Bearings		**	Clean, dry check, inspect and repack.
				Reinstall and tighten to factory specifications.
				Replace wheel seal.

**PERFORM THESE FUNCTIONS WHEN REPLACING BRAKE LINING OF AS CALLED FOR BY FACTORY SPECIFICATIONS.

G. UNDER BUS

G – 1	Exhaust System	1	2	Check for leaks and proper mounting of all exhaust components.
G – 2	Clutch	1	2	Check free travel (adjust if necessary)
			2	Lubricate linkage and check for wear. Check clevis pins, clips, and retainers.
G – 3	Air Tanks	1	2	Purge all tanks and or compartments with manual drain valves.
		1	2	Check operation of automatic bleeder (DV-2).
G – 4	Transmission	1	2	Check for leaks and proper mounting.
G – 5	Parking Brake	1	2	Check linkage and adjust.
		1	2	Check for oil soaked or worn lining.
G – 6	Drive Line	1	2	Check "U" joints, yokes, splines, and flange bolts for looseness and wear.
		1	2	Check phase or timing of drivelines.
			2	Check center bearing(s), mounting brackets, and hangers for looseness and wear.
			2	Check drive shaft guards for looseness.
G – 7	Fuel Tanks	1	2	Check connections, plugs, and breather.
			2	Tighten all tank and safety cage mounting bolts.
G – 8	Hoses, Piping, and Wiring	1	2	Check all hoses, piping, and wiring for proper routing and securement.
G – 9	Air Dryer	1	2	Check automatic purge cycle.
			2	Service element per manufacturer's guidelines.
			2	Check mounting bolts.

G. UNDER BUS

G – 10	Brake Chambers	1	2	Check for secure mounting and proper operation.
		1	2	Check for proper angle (push rod to slack adjuster)
		1	2	Check for equal push rod travel (chamber to slack adjuster)
		1	2	Check for dents, cracks or other damage.
		1	2	Check all supply hoses for deterioration or damage.
G – 11	Frame and Crossmembers		2	Check for cracks, loose brackets, broken welds, and loose bolts.

SECTION III – SHOP RECORDS AND INVENTORY CONTROL

Adequate record keeping is essential to a preventive maintenance program. Maintenance records enable fleet management personnel to plan for and schedule needed maintenance work. Accurate records may also be needed to support warranty claims or to provide information for accident investigations. Even more important, well-kept maintenance records can be used by management personnel to monitor the maintenance program and determine its effectiveness.

Among the documents that should be included in a vehicle maintenance file are the mechanic's inspection reports #1 and #2, and a copy of repair orders indicating the repairs performed and the routine work such as lubrication, oil, and filter change that has been completed. The bus make, model, serial number, line set ticket, and tire information should also be included. Data may be transferred to a ledger or computer printout sheet for retention and future reference.

The sample forms included in this section may be used by school divisions to improve present methods of record keeping and of inventorying of parts and supplies.

Work or repair orders are used to aid personnel in performing necessary repairs and service and in providing adequate maintenance and cost records for each school bus. The orders serve as a means of comparing parts used to parts in stock or purchased. Retention of these orders makes it possible to maintain a complete history of all repairs and service performed on each bus, therefore, the orders should contain all pertinent information and be retained for the life of the bus. All labor costs must be included on repair orders to provide accurate cost accounting.

Inventory records of parts, tires, tubes, batteries, lubricants, etc., are essential in stocking such items. These records also provide a means of controlling inventory so as to ensure that parts are being used on authorized vehicles. It is imperative that all items taken out of inventory appear on a repair order so that they can be charged to the proper vehicle.

A stock requisition form may be used to ensure that all parts taken out of inventory are charged on the proper repair order. This form can be a valuable tool in inventory control and also can improve the accuracy of maintenance records.

Inventory records and reports on fuel and motor oil are essential in maintaining accurate information on each vehicle as to operational cost and consumption of fuel and motor oil. Such records also can be used to check on pilferage and unauthorized use. All fueling locations must be staffed by competent personnel who can see that proper control and distribution are maintained. The monthly fuel and motor oil report supplies management with the information on the amount of fuel and motor oil used, and mileage on each vehicle in the fleet. The daily report used at each fueling location provides a record of all fuel and motor oil dispensed from the location and of the vehicles that received it.

SCHOOL BUS GARAGE REPAIR ORDER 00910

ACCT	QTY	PART#	DESCRIPTION	PRICE	
			TOTAL		

DIVISION	YEAR	DATE
DRIVER	MODEL	MILAGE
BODY	CHASSIS	MODEL

OPER. NO	INSTRUCTIONS	LABOR CHGS.	

GAS			TOTAL LABOR		
OIL, QTS.			TOTAL PARTS		
GREASE, LBS.			ACCESSORIES		
MISC.			GAS,OIL,GREASE		
			OUTSIDE REP. ?		
			TAX		
TOTAL			TOTAL AMOUNT		

PARTS INVENTORY

PART NO.	DESCRIPTION

COST______________ MAX. QTY.__________MIN. QTY.____________

DATE	DOC.#	ON HAND	DATE	DOC.#	ON HAND	DATE	DOC.#	ON HAND

STOCK REQUISITION

BUS NO._____ DATE_____

QUANTITY	PART NO.	PART NAME	COST

ISSUED BY_____ ISSUED TO_____

MONTHLY INVENTORY OF TIRES, BATTERIES, ANTIFREEZE, LUBRICANTS, AND FLUIDS

SCHOOL DIVISION_____MONTH_____YEAR_____

TIRES

	SIZE	COST	SIZE	COST	SIZE	COST	SIZE	COST	SIZE	COST
# START MONTH										
# USED MONTH										
# PURCHASED										
# MONTH END										

BATTERIES ANTIFREEZE

	SIZE	COST	SIZE	COST	SIZE	COST	GALS	COST	QTS.	COST
# START MONTH										
# USED MONTH										
# PURCHASED										
# MONTH END										

LUBRICANTS AND FLUIDS

	GREASE		GEAR OIL		P/S FLUID		BRAKE FLD		W/W FLUID		HYD FLUID	
	QTY.	COST	QTY.	COST	QTY.	COST	QTY.	COST	QTY.	COST	QTY.	COST
# START MONTH												
# USED MONTH												
# PURCHASED												
# MONTH END												

SIGNATURE OF PERSON TAKING INVENTORY_____DATE____

MONTHLY INVENTORY AND REPORT ON FUEL AND MOTOR OIL USED AT EACH STATION

MONTH OF_____ 19___ LOCATION_____

1.NUMBER OF GALLONS FUEL ON HAND BEGINNING OF MONTH		
2.NUMBER OF GALLONS RECEIVED THIS MONTH		
3.TOTAL NUMBER OF GALLONS		
4.NUMBER OF GALLONS DISPENSED		
5.NUMBER OF GALLONS AT END OF MONTH		
6.FUEL PUMP METER READING (MONTH START)		
7.FUEL PUMP METER READING (MONTH END)		
8.MOTOR OIL (MONTH START)	GALS.	QTS.
9. MOTOR OIL RECEIVED THIS MONTH	GALS.	QTS.
10.TOTAL MOTOR OIL	GALS.	QTS.
11.MOTOR OIL USED THIS MONTH	GALS.	QTS.
12.MOTOR OIL MONTH END	GALS.	QTS.

SIGNATURE OF PERSON SUBMITTING REPORT_____

NOTE: A SEPERATE FORM MAY BE USED FOR LEADED, UNLEADED, AND DIESEL FUEL

FUEL AND MOTOR OIL REPORT

DATE_____ LOCATION_____

METER READING START		METER READING END	
LEADED GASOLINE		LEADED GASOLINE	
UNLEADED GASOLINE		UNLEADED GASOLINE	
DIESEL FUEL		DIESEL FUEL	

BUS #	LEADED	UNLEADED	DIESEL FUEL	MOTOR OIL	ODOMETER	REMARKS

MONTHLY FUEL AND MOTOR OIL REPORT

BUS #_____ LODCATION_____MONTH END ODOMETER_____

DRIVER_____MONTH START ODOMETER_____

FOR MONTH OF_____19___ TOTAL MILEAGE FOR MONTH_____

DAY	LEADED GAS	UNLEADED GAS	DIESEL FUEL	MOTOR OIL	ODOMETER
TOTAL					

SECTION IV – RECORD KEEPING WITH A COMPUTER

Record keeping with the use of a computer has proven to be a beneficial method to help reduce maintenance costs. By automating the maintenance operations, managers have been able to better justify their budgets. Through the reporting functionality of the software and the stored data, managers can accurately report costs of parts and supplies. They can also report manhours required for repairs and develop data to make determinations on future scheduling. Computer systems used for maintenance management can track valuable data and show any trends regarding specific activities, including the following information, tracked by both vehicle and by fleet:

Cost of repairs – parts and labor

Fuel consumption and fuel cost

Total operational cost

Historical data of inspection and repairs

Historical data of all expenditures

Bus data base by manufacturer, year make, body type, etc.

Personnel information, timekeeping, payroll, etc.

With the variety of computer systems and software in today's marketplace, and the competitive pricing of these items, all school divisions, both large and small, should strive to obtain the appropriate computers and maintenance software to fully automate their maintenance activity.

Maintenance operations that do not utilize pre configured, "out of the box" maintenance software can still have ready access to information regarding any aspect of their operation by using Microsoft EXCEL or ACCESS. These two applications are suitable for the set up of a basic data storage/retrieval system that can be of great value to any maintenance activity.

Anyone using computers to control their maintenance operations must always remember that the computer is only as good as the data entered into it. Personnel must be properly trained in its use, and they must have the correct data entered on a consistent basis. Any gaps or incorrect information in the data entry will nullify any attempts to use the data for any type of analysis or reporting functions.